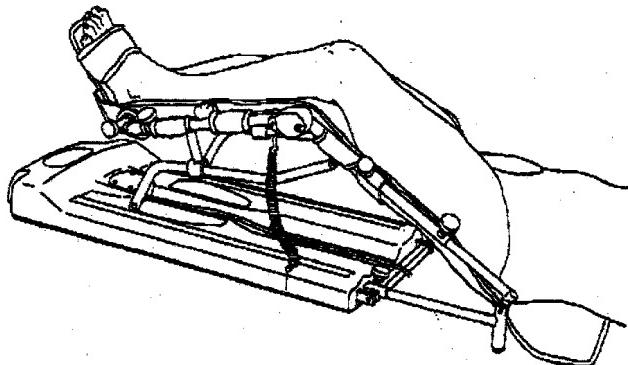


SERVICE MANUAL



PERFORMA

Smith+Nephew
Leadership in Worldwide Healthcare

Page 1



Smith & Nephew Kinetic S.A. - Z.I. de Toumey-Cirren - B.P. 1108 - F-08080 Toumey
Tel. : (0)3.24.52.91.21 - Fax : (0)3.24.52.90.34

Issued 18/08/98



CONTENTS

I • DIFFERENT FAILURE SITUATIONS FOR THE PERFORMANCE

	Page
1 • The display is blank.....	3
A - Procedure for removing the upper cover	4
B - Electrical check.....	4
2 • The display shows a value but the unit does not work	5
3 • The unit does not continue through its programmed cycle.....	5
4 • Replacing the motor.....	5
5 • The unit works but the display doesn't	5
6 • The LCD is not clear	5
7 • How to change the hand control.....	5

II • DIFFERENT MESSAGES

SERVICE D1	6
Replacing the copy potentiometer.....	6 - 7
SERVICE D2	7
SERVICE D3	7
MESSAGE SERVICE	8
LOW BAT	8
LOCK	8

III • LOAD ADJUSTMENT PROCEDURE

Load adjustment.....	9
----------------------	---

IV • INVENTORY OF SPARE PARTS REQUIRED

TO SERVICE APPROXIMATELY 10 MACHINES..... 10

V • REQUIRED TOOLS..... 10

VI • RETURNING THE UNIT TO OUR SERVICE FACILITY..... 10

VII • APPENDICES

- Spare parts list
- User's manual

Smith+Nephew
Leadership in Worldwide Healthcare

Page 2



Smith & Nephew Kinetec S.A. - Z.I. de Tournes-Ciron - B.P. 1109 - F-08090 Tournes
Tel. : (0)3.24.62.91.21 - Fax : (0)3.24.62.90.34

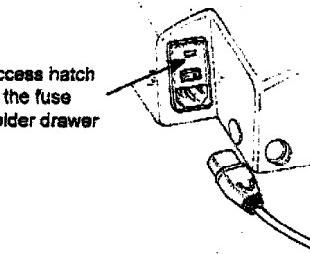


Issued 199909

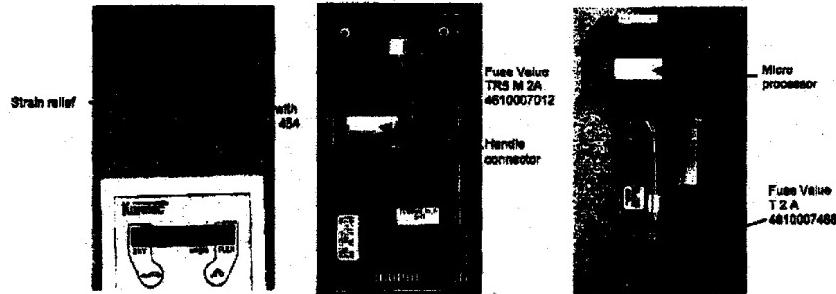
I - DIFFERENT FAILURE SITUATIONS FOR THE PERFORMANCE

1 - The LCD display is blank

- Check the input supply voltage, it should be between 110 vac and 220 vac:
- Check that the main power cable is correctly plugged in
- Check the continuity of the two fuses in the power input block: 6.3 x 32 mm, T 500mA fuse reference 4610002400. Use only KINETEC fuses (UL approval)



- Check the condition of the fuse (part number: 4610007012) in the hand control or
To open the hand control:
Remove the 4 screws on the bottom but after to unscrew these ones the hand control box will be open on half.
You have to heat the strain relief (stuffing box) with a heat gun to disassemble the nut (a) which is glued on the nut (b). And then you can push on the cable and you will be able to open the box.
Take care, don't turn the nut (b) because the cable inside will turn and have damage inside the hand control.

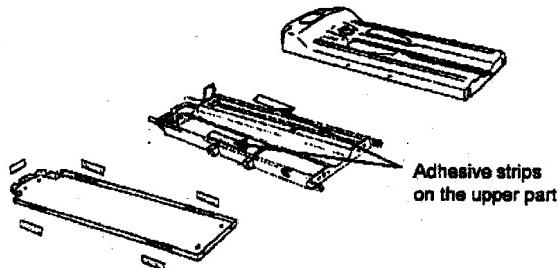


- Check that the hand control cable is correctly connected inside the hand control (connector locked).
- Check if the micro processor is correctly seated on its support.
Push on it and fix it with an adhesifblock stop lenght 6,7mm.

Open the machine only after making these various checks.

A - Procedure for removing the upper cover reference 4670016582

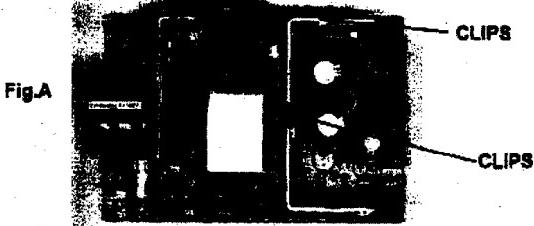
- Remove the two pins, reference 4635001601, that hold lower leg support on the ball screw drive support 4670016417.
- Remove the carrying handle Ref. 4625000671 (2 screws) and the knob at the extremity of the frame.
- Remove the 4 screws that hold the stuffing box cover plate, 4670016574.
- Cut the adhesive strips fixing the lower case, reference 4635005942, to the upper case.



B - Electrical check

- Refer to the attached electrical diagram 467810077/467810081 A.
- Check if the two metal clips attached to the voltage regulators are correctly positioned (see the Fig.A).
- Check the condition of the fuse on the power supply board: 5x20mm 2 amper fast fuse reference 4610008866.
- Make sure that 220V or 110V is present at the input of the power supply board, reference 4610008543, between the white and black wires (see 467810077).
- Check the output of the power supply board: 12 V between the red and black wires
- Check the distribution pc board input: 12 V between the red and black wires
- Check the distribution pc board output
- Check the hand control voltage: 12 V between the orange and black wire in the cable. Replace the cable if it is defective.

If the hand control still does not work after all these checks, please return the hand control assembly for repair or possible warranty replacement.



Smith+Nephew
Leadership in Worldwide Healthcare

Page 4



Smith & Nephew Kinetec S.A. - Z.I. de Tournes-Ciron - B.P. 1109 - F-08080 Tournes
Tel.: (0)3.24.52.91.21 - Fax : (0)3.24.52.90.34

Issued 10/06/98

**2 • The display shows a value but the unit does not work
(e.g. : 0 RUN 55 115)**

- Check if the micro processor is not unsated, if yes, fix it with a adhesif block stop lenght 6,7mm.
- Check the condition of the flexible coupling reference 4670015328
- Check the voltage supplied to the motor (see diagram No. 467810077/467810091A); the voltage between the red and black wires should be between 2.7 volts at the minimum speed setting, and 10.4 volts at the maximum speed setting.
- If there is not any voltage supply to the motor, check the cable continuity and insulation of the hand control cable.
- Replace the motor if power is present and it does not work.

3 • The unit does not continue through its programmed cycle

Allow the unit to run for 10 minutes between 20° extension and 90° flexion. If it's always the same, check the motor consumption. It should be between 0.4A and 1A.
If the motor consumption exceeds 1 ampere, after 10 minutes replace the motor.
If the consumption is within the values mentioned above but the unit does not continue its cycle, perform the force adjustment procedure.

4 • Replacing the motor

BE CAREFUL : the motor serie 1 is different than the motor serie 2.
Even though the motor is run-in at our factory, it will still need to be run before making the force adjustments (see the procedure for load adjustment).
After replacing the motor allow the unit to operate for 24 hours with a programmed range of 10° extension and 80° flexion, then make the force adjustments.

5 • The unit works, but there is nothing on the display.

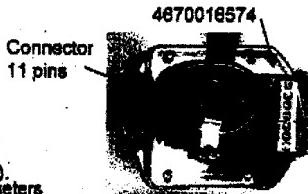
Check if the micro processor is not unsated.
Check the primary and secondary fuse.
Change the hand control.

6 • The LCD is not clear or it miss some digit's.

Change the LCD Ref. : 4610006585.

7 • How to change the hand control.

BE CAREFUL : the hand control serie 1 is different than the hand control serie 2
- Remove the stuffing box cover plate 4670016574;
- Remove the ground strap
- Disconnect the cable on the small PCB (11 pin connector).
- When a new hand control is installed, the following parameters will have to be checked :
 • the load
 • the maximum range of motion: -3° extension to 130° flexion (see the procedure "Replacing the copy potentiometer" for information on how to adjust the parameters)



II • ERROR MESSAGES

SERVICE D1

- Check the continuity of the spiral copy potentiometer cable reference 4610008876. If the continuity is good, replace the copy potentiometer.

Replacing the copy potentiometer

WARNING: adjust the femur component of the carriage to 43cm before making adjustments to the unit.

- Change the copy potentiometer and tighten all its attachment screws
- Switch the unit on: there are two possible cases that will be displayed by the LCD : the angle or D1.

Case 1 : If the hand control displays an angle of between -3° and 130°.

- Depress the Stop key on the hand control.
- Use a goniometer to measure the real mechanical angle (α) of the unit at the knee hinge.

- Loosen the 3 copy potentiometer mounting screws and rotate the copy potentiometer until the angle displayed on the LCD is the same as the goniometer reading.

- Start then Stop the unit when the angle measured by a goniometer reaches 0°

- Adjust the copy potentiometer again until the LCD displays -1°.

- Tighten the copy potentiometer mounting screws.

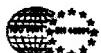
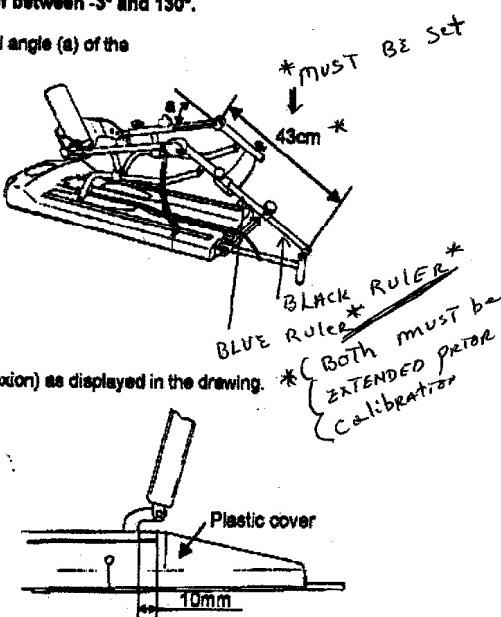
Operate the unit and stop it 10mm from the end (flexion) as displayed in the drawing.

The LCD must display 130°. If not adjust the small potentiometer located in the hand control.

This potentiometer is located in the back of the hand control under the label. There is a small hole in the case which will allow the potentiometer to be adjusted with a small screw driver.

- Clockwise: increase the angle
- Unclockwise: decrease the angle

Care should be taken when performing this operation. The screwdriver must be engaged and in contact only with the small potentiometer. Adjust the potentiometer very slowly.



Case 2 : the unit displays "service D1"

Loosen the copy potentiometer screws and rotate the potentiometer until an angle between -3° and 130° is obtained.

Continue following the adjustment procedure from case 1.

SERVICE D2

The following may cause an error D2.

If a voltage is present at the motor and there is not a change in the angle of the carriage.
Check : a.The tightness of the potentiometer shaft coupler 4670015360.

b.If the two knobs which fix the femur telescoping bar and the femur bar are not tightened sufficiently, the two tubes will "telescope", which will result in a D2 error.

SERVICE D3

The following may cause an error D3

a) The motor leads are reversed.

If the motor was replaced, check the wiring:
red wire on M+, black wire on M-.

b) The hand control is not configured as a Performa hand control.

Check the configuration of the hand control (see the load adjustment section for the proper configuration).

c) The motor is physically blocked.

Switch the main supply switch ON/OFF one or two times and then check again.
If the D3 error continues the motor will require changing.

LOW BAT

- Check if the micro processor is not unseated of it's support.

- Switch ON/OFF the main power, If the problem persists, change the hand control.

LOCK

Unlock the unit with the lock switch knob or if the unit has been locked with the special code, switch ON/OFF on the main power.



Smith+Nephew
Leadership in Worldwide Healthcare

Page 7



Smith & Nephew Kineta S.A. - Z.I. de Toume-Ciran - B.P. 1109 - F-08090 Toume
Tel. : (0)3.24.82.91.21 - Fax : (0)3.24.82.90.34

Issued 10/06/96



SERVICE MESSAGE

After 2000 hours of working time, the KINETEC Performa will need to have preventive maintenance performed.
This is indicated by the message SERVICE !! when CPM unit is turned on.

MAINTENANCE TO BE PERFORMED :

- Remove the upper plastic cover.
- Grease the ball screw with SKF LGWN.
- Grease the thrust bearings at each end of the ball screw; use LABO GS1412.
- Grease the knee articulation points: use MOLYCOTE PG75.
- Grease the two rubber strips: use MOLYCOTE PG54.
- Grease all of the mechanical articulation points: use WYNNS OIL or LABO GS1412.
- Check the motor coupling sleeve and the mounting shock absorbers.
- Check the spiral copy potentiometer cable and the hand control cable.
- Check the load adjustments.
- Check the R.O.M.
- Check for noise.
- Check the grounding point, leakage current, insulation, and dielectric test.

Resetting the 2000 hours - Hourmeter

- Put the memory lock switch in the UNLOCK position.
- Depress the START key (RUN), then the STOP key (STOP).
- Depress simultaneously the 4 keys -, +, EXT and FLEX.
- Follow the instructions on the display.
- At ENTER code, depress EXT, then FLEX, then -, and then +.
- At CONFIRM code, depress +, the -, then FLEX and the EXT.
- At TT=x00d-xx, wait for 5 seconds and depress simultaneously EXT and FLEX.
- Display indicates 200 110 200 (numbers are only as example).
- Depress the TIMER key, (i.e. watch figure).
- At MOTOR IS DUNKER, depress the TIMER key.
- At STIMU IS NF, depress the TIMER key.
- At SERV.!!MSG ON, depress TIMER key.
- At SERVICE!!-, depress the + key.
- At SERVICE!!-RESET, depress the TIMER key.
- At CPM TYPE: PERFORMA, depress the TIMER key.
- When the LCD displays 200 110 200, depress the START key.
- To quit the PARAMETERS mode wait for 5 seconds when TOTAL TIME is displayed or switch OFF the unit.

Smith+Nephew
Leadership in Worldwide Healthcare

Page 8



Smith & Nephew Kinetec S.A. - Z.I. de Tournes-Ciron - B.P. 1109 - F-06090 Tournes
Tel. : (0)3.24.52.91.21 - Fax : (0)3.24.52.90.34



Issued 10/06/98

III • LOAD ADJUSTMENT PROCEDURE

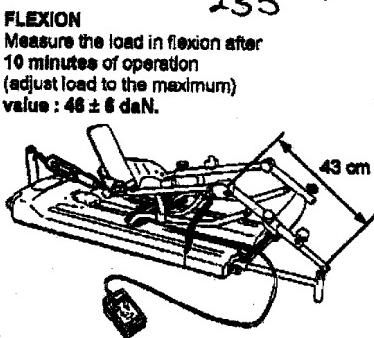
Weight setting page

The loads are adjusted by recorded parameters.
To modify the loads, follow the diagrams and instructions to measure the forces and then to adjust the parameters.

FLEXION

Measure the load in flexion after
10 minutes of operation
(adjust load to the maximum)
value : 46 ± 6 daN.

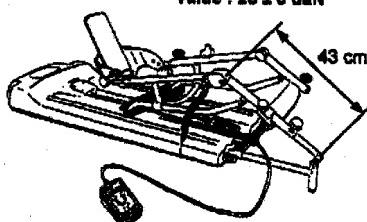
235



235

EXTENSION
Measure the load in extension after
10 minutes of operation

value : 26 ± 6 daN



Load adjustment

Procedure A : Unit STOPPED

- 1) Press on EXT, FLEX, - and + simultaneously; the display shows "CODE"
- 2) Then press on EXT, FLEX, - and + in sequence; the display shows "CONFIRM"
- 3) Then press the +, -, Flex, Ext in sequence; for example the display will show "TT=102.4H"
- Press the EXT and FLEX keys simultaneously. The display will show a set of numbers such as "85 110 195" as an example.
- Where: 85 = extension parameter, and 195 = flexion parameter
- 5) Press the EXT key, to activate the extension parameter
- 6) Press the + or - keys to increase or decrease extension load respectively
- 7) Press the FLEX key, to activate the flexion parameter
- 8) Press the + or - to increase or reduce the force in flexion respectively

Procedure B :

- 1) Press the EXT, FLEX keys simultaneously; VERSION will then be displayed
- 2) Press immediately the FORCE key when VERSION appears
- 3) Continue with procedure "A" starting from number 5.

Smith+Nephew
Leadership in Worldwide Healthcare

Page 8



Smith & Nephew Kinetec S.A. - Z.I. de Tournes-Ciran - B.P. 1109 - F-08090 Tournes
Tel. : (0)3.24.62.81.21 - Fax : (0)3.24.62.90.34



Issued 10/00/00

IV • SPARE PARTS TO BE KEPT IN STOCK FOR ABOUT 10 MACHINES

- 2 - 4650001058: complet pad
 - 1 - 4670016897: complete hand control for Optima s3
 - 1 - 4670015328: elastic coupling
 - 1 - 4670015378: motor
 - 1 - 4670016821: upper casing
 - 1 - 4610004539: copy potentiometer
 - 10 - 4625000697: male button
 - 4 - 4625000720: female button
 - 10 - 4610002400: 500 mA 6.3x32mm timed fuse
 - 5 - 4610002110: 11.5 A hand control fuse
 - 10 - 4610008866: 2 amperes 5x20mm fast fuse
 - 1 - 4610006907: handle cable
 - 1 - 4610006628: VDE mains cable
 - 1 - 4635005611: upper leg hinge assembly
 - 1 - 4610006915: keypad for rectangular hand control
 - 1 - 461000247: keypad for ergonomic hand control
 - 1 - 4635005582: 1 roller of 33 meters of double side adhesive tape
(for sticking the casing).
- 4610006858 T 1,6x5x20
4610005173

Please refer to the series of your unit for part references, for example 431 Series 2 and then refer to the Series 2 spare parts catalogue.

V • REQUIRED TOOLS

- 0-30V 2.5 ampere stabilized power supply
- Ampermeter, ohmmeter, voltmeter
- 2 - 2.5 - 3 - 4 Allen spanners
- Philips screwdriver
- 2.5 pin drift
- Flat screwdrivers
- Goniometer (amplitude adjustment)
- 0 - 50 daN dynamometer (load adjustments)
- Dynamometer attachment tools.

VI • RETURNING THE UNIT TO OUR WORKSHOPS

Please do not include pads when returning the knee CPM unit to our workshops, due to health and safety standards within our company. This pads will be systematically incinerated.

VII • REPAIR INFORMATIONS

If you want repair information you must have the serial number of the unit.